

of the College of Agriculture of Tōkyō contains an interesting contribution to this question by Dr. U. Suzuki. Experiments were carried out with several species of plants and in soils containing varying amounts of calcium. The results show that strontium and barium can never replace calcium in phanerogams, as they are strongly poisonous, although the poisonous action may be lessened to a certain extent by the addition of lime salts. The *Bulletin* also contains papers by the same author on arginin, and its formation in coniferous plants; and by K. Asō, on the chemical composition of the spores of *Aspergillus Oryzae*.

AMONGST the products of the action of fluorine upon sulphur recently investigated by M. H. Moissan (see NATURE, April 19, vol. lxi. p. 597), thionyl fluoride, SOF<sub>2</sub>, the existence of which was first indicated by M. Meslans, was noticed. MM. Moissan and Lebeau have now made this fluoride the subject of a more detailed study, and have succeeded in obtaining it in a pure state by two different methods—by the action of fluorine upon thionyl chloride, and by the interaction of fluoride of arsenic upon thionyl chloride. Thionyl chloride is a colourless gas, fuming slightly in moist air, and possessing an unpleasant odour resembling carbonyl chloride. It is easily condensed by a mixture of solid carbon dioxide and acetone, giving a liquid boiling at -32°. In the absence of moisture, glass is not attacked by the gas at temperatures below 400° C.; above this temperature silicon tetrafluoride and sulphur dioxide are produced. Water decomposes thionyl fluoride slowly at ordinary temperatures, giving hydrofluoric and sulphurous acid. Indications were obtained of another oxyfluoride of sulphur, not absorbed by water and possessing a much lower boiling point.

THE additions to the Zoological Society's Gardens during the past week include two Wild Swine (*Sus scrofa*, ♀ ♀), European, presented by the Lord Carnegie; three Chaplain Crows (*Corvus capellanus*) from Southern Persia, presented by Mr. B. T. Finch; a Herring Gull (*Larus argentatus*), European, presented by Mr. J. W. Berry; two Red Howlers (*Myiotes seniculus*, ♂ ♀) from Colombia, a Great Kangaroo (*Macropus giganteus*, ♂) from Australia, an American Flying Squirrel (*Sciuropterus volucella*), three American Box Tortoises (*Cistudo carolina*), a North American Trionyx (*Trionyx ferox*), three Changeable Tree Frogs (*Hyla versicolor*) from North America, a Black Sternotherere (*Sternothererus niger*) from West Africa, two Greek Tortoises (*Testudo graeco*), South European; six Argentine Tortoises (*Testudo argentina*) from the Argentine Republic, a Red and Yellow Macaw (*Ara chloroptera*) from South America, two Black-headed Caiques (*Caica melanocephala*) from Demerara, a Chough (*Pyrrhocorax graculus*), British, deposited; two Brown Mynahs (*Acridotheres fuscus*) from India, a Brown Mock Thrush (*Harporhynchus rufus*) from North America, an Occipital Blue Pie (*Urocissa occipitalis*) from the Western Himalayas, purchased; two Thars (*Capra jemalicus*), five Swinhoe's Pheasants (*Euplocamus swinhoii*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

PHOTOGRAPHIC OBSERVATION OF EROS.—A circular from the Centralstelle at Kiel furnishes particulars of the photograph of the planet Eros obtained by Prof. Howe, of Denver Observatory, U.S.A., during the recent total eclipse. The position determined was:—

R.A. 23h. 47m. 3'95. } 1900 May 27<sup>9</sup>129.  
Decl. + 2° 46' 33" } Greenwich Mean Time.

OCCULTATION OF SATURN.—There will be an occultation of Saturn by the moon on Wednesday evening, June 13, the particulars of which are as follows:—

NO. 1597, VOL. 62]

	Sidereal Time.		Mean Time.		Angle from	
	h. m.	...	h. m.	...	North Point.	Vertex.
Disappearance ...	15	7	9	40	89	116
Appearance ...	16	19	10	52	265	283

The planet rises about 8.55 p.m., so that the conditions for observation will not be very favourable.

HARVARD COLLEGE OBSERVATORY.—In *Circular* No. 50 issued from the Harvard College Observatory, Prof. E. C. Pickering reviews the methods adopted in the measurement of photographic light intensities. Since 1887 all the photographs obtained at the Observatory have had the image of a standard light impressed upon them for comparison. The methods now adopted have been developed by Mr. E. S. King, under whose direction the photographs are taken at Cambridge, and his description of the plan followed occupies the greater part of the circular. All sources of light, that of the sun, moon, sky, Milky Way, aurora and stars are to be referred to one standard, given by the meridian photometer, with which Polaris has a magnitude of 2.15. The artificial standard for practical convenience is that given by an Argand burner behind a small aperture; but this is compared with Polaris every month, when a series of tests are made on a 8 × 10 in. plate, the various parts of which are then cut and stored for future inspection. These monthly comparisons in addition furnish a valuable check on the constancy of the plate and the developer used, and will, moreover, as the several parts of the divided plate are developed at different periods, furnish data concerning any change in the image dependent on the interval between exposure and development. Spectroscopic photometry is also adopted to record the photographic intensity in terms of light of a particular wavelength.

Prof. W. H. Pickering has evolved a method of reducing the standard of comparison to the actual radiation received from a certain star shining directly on the plate. This unit, however, being so small, secondary and tertiary standards have been made from it by using lenses of known aperture and focal length. Thus, with a simple plano-convex lens of 8.2 cm. aperture, the image of a Ursæ Minoris was received on a piece of ground glass placed 3 cm. from the photographic plate. The "sensitive tint" was produced after twenty minutes' exposure, and the intensity of the light was calculated to be thirty times greater than the direct radiation from the star. For lights of great intensity this secondary standard is still too small, and then recourse is had to the Argand burner constant.

LIVERPOOL OBSERVATORY.—We have received the report of Mr. W. E. Plummer, the director of the Liverpool Observatory at Bidston, Birkenhead, on the work done in the year 1899. Although the seismograph has not been in use all the year, it is intended to commence keeping a continuous record of earth movements by means of the present instrument and one to be supplied by the Earthquake Committee of the British Association. The two will be placed so as to record movements in planes at right angles to each other.

The report contains detailed results of all meteorological observations during the year, including temperature, barometric pressure, rainfall, sunshine and cloud, wind velocity, humidity, &c.; and an appendix is added containing a summary of the mean values of many of these quantities during the past thirty years.

TEMPERATURE CONTROL OF SPECTROGRAPH.—In the *Astro-Physical Journal* (vol. xi. pp. 259-261, 1900), Prof. W. W. Campbell describes the arrangement he has finally adopted for securing as complete uniformity as possible of the temperature of the various parts of the spectrograph used at the Lick Observatory for determining stellar velocities in the line of sight. The whole instrument is first enclosed in two thicknesses of thick grey blanket, the prism case having an additional two thicknesses over it. Outside the whole is then fitted a case of cedar, lined with felt, in which is embedded a length of German silver wire. This latter is heated by an electric current, the strength of which is so regulated that a thermometer placed in the prism box shows as constant reading as possible. The efficiency of the device is clearly shown by a table giving the actual variations observed during a night's work. From 8.28 p.m. to 4 a.m. the temperature of the air in the dome varied from 17°.2 C. to 19°.0 C., but the extreme readings of the thermometer in the prism box were only 18°.70 C. and 18°.84 C., so that the maximum variation was less than one-fifth of a degree.